AMENDMENTS TO THE SPECIFICATION:

Please substitute the following amended paragraph for the pending paragraph beginning on page 10, line 17, and continuing to page 12, line 15:

In accordance with the invention, background current circuit 100 is connected in parallel with secondary 52. There is a direct connection by lines 52a, 52b. There is no separate power supply or supplemental power source. The secondary operates circuit 100 which includes a full-wave rectifier 110 formed by diodes D1, D2, D3 and D4. Rectifier 110 has standard AC inputs 112, 114 and standard DC outputs 116, 118. Switch 120 connects rectifier 110 in parallel with secondary winding 52 when the welder is turned on. Circuit 100 provides current to DC nodes 32, 34 of bridge 30. If the switches are conductive circuit 110 is not active. However, during times of non conduction, which are substantial at low currents, such as less than 5.0 amperes, there is substantial time of switch non conduction. The connection is by lines 120a, 120b. In the illustrated embodiment, switch 120 is a TRIAC network having TRIAC 122 gated by photo-TRIAC 124 and resistors 130, 132 with noise filter capacitor 134. LED 140 is energized through resistor 142. Activation of switch 120 is accomplished by energizing LED 140 to allow AC current to flow through resistors 130, 132 for actuating TRIAC 132. The connection between LED 140 and TRIAC 124 is optical because TRIAC 124 is light sensitive. When welder A output is turned off, TRIAC 124 is not energized and TRIAC 122 is deactivated. Circuit 100 produces an alternating background current that is a full wave rectified current connected to the welding operation at workpiece 16 and electrode 18 through resistors 150, 152, corresponding to resistors 54 and 56 in FIGURES 1 and 2. These resistors control the background current and voltage

available to the welding output. For a common TIG welder having an open circuit voltage of about 70-80 volts and an operating voltage in the neighborhood of 13-16 volts, it has been found that the resistance of background current circuit 100 (resistors 150, 152) is generally in the range of 20-30 ohms, and preferably about 24-25 ohms to provide a welding operation of about 2 amperes at 13 volts. Thus, for a common welder, resistors 150, 152 (54, 56) have a combined resistance in the general range of 20-30 amperes. The total resistance can be divided between the inlet and outlet resistors; however, each SCR has a resistor and diode in parallel. The resistor limits current in the parallel circuit. The current waveforms associated with this preferred embodiment are illustrated in graphs of FIGURES 4 and 5. In FIGURE 4, the graph in dashed lines is the secondary AC voltage 200 having a positive half cycle 202 and a negative half cycle 204. Gating pulses 210, 212 initiate the respective gated switches to cause voltage spikes 220, 222 from the AC input. These current spikes cause current pulses 230, 232 through DC choke 12 as shown in FIGURE 5. When connecting bridge 30 for AC operation, choke 12 is connected across the DC terminal of the gated bridge. The graph in FIGURE 4 is illustrative of low current operation for welder A. A low current welding background current fills the gaps between SCR current spikes 220, 222 and is shown as current 240 in FIGURE 5. FIGURE 5 represents DC operation of bridge 30; therefore, current pulses ~~130, 132~~230, 232 have been rectified and are in the positive direction. Current 240 from circuit 100 is controlled by the resistance level of resistors 150, 152 (54, 56). Background current 242 occurs during the positive half cycle while background current 244 occurs during the negative half cycle. When gating signals 210, 212 are created for low current operation, resistors

150, 152 are shunted. The shunted portion of the background current illustrated as portions 250, 252, 254 and 256. When there is an open circuit, the bridge is full on and the diode and resistors of circuit 100 are bypassed. The present invention is illustrated in FIGURE 5 as used for a DC welding operation.

Please substitute the following amended paragraph for the pending paragraph beginning on page 13, line 6, and continuing to page 14, line 6:

A modified background current circuit 100a is illustrated in FIGURE 9 where rectifier 110 has a filter capacitor 260 where a portion of the 10-15 ohms resistance, such as about 2 ohms in the AC path of the rectifier has resistors 262, 264. These resistors limit inrush of current to capacitor 260. The filter capacitor results in continuous DC background current wave shape that essentially fills in the valley between the positive and negative current portions 242, 244, as shown in FIGURE 5. This flattens the background current and allows still lower current welding. By using this filter concept, the current remains in existence without a fill-in by successive SCR spikes. Another modified background current circuit ~~110b~~100b is shown in FIGURE 10. This circuit allows low current cleaning or penetration during AC operation of the background current circuit. Rectifier 300 has DC resistors 310, 312 during the positive half cycle and 314, 316 during the negative half cycle. By adjusting the total resistance of ~~resistor~~ resistors 310, 312 with respect to resistors 314, 316, the current during the positive and negative half cycles has different magnitudes. During AC operation, these magnitudes are different directions to allow more cleaning or penetration of the workpiece even during low current operation when essentially the background current is

doing the welding. The results of using the imbalance background current by the circuit of FIGURE 10 are shown in FIGURES 11 and 12. In FIGURE 11, the welder is open circuit (no arc); consequently, bridge 30 is full on and circuit 100b is shunted and AC current 400 is not distorted to any great extent. At low welding currents, as shown in FIGURE 12, the AC current 410 has positive pulses 412 with higher background current and negative pulses 414 with lower background current. This allows cleaning even at very low current. By reversing the levels of resistors used, higher negative background current with lower positive background current can be obtained for low current penetration effect. This is not allowed in prior units.